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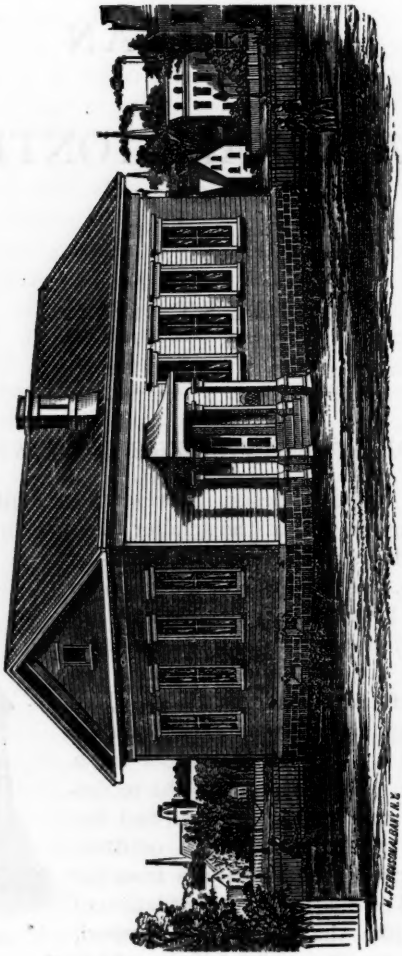
*SCHOOL HOUSES FOR THE COUNTRY.**

THE plan of this design represents a building approaching the size of the smaller Union Schools. As represented, the school-room has seats for seventy pupils, and by a slight addition to its length and breadth, may be made to accommodate from eighty to one hundred. The entrances are from the sides, and the two sides are finished exactly alike. This will give a large and commodious lobby for each sex, and a fine recitation-room for a second teacher. The entrance to the recitation-room may be from the porches, and the door in front of the school-room omitted, leaving the entire space directly in front for blackboard. The heating and ventilation of this room is like that already described. The rear doors may be omitted if thought best.

Fig. 64.

ELEVATION NO. 1.—This elevation represents a plain wood

* From Johonnot's New Work on School Houses.



ELEVATION No. 1.

building finished with ordinary siding. The windows are placed in the usual manner, the roof is made with as little pitch as is compatible with the use of shingles. No ornamental work has been admitted. The cornice is plain and substantial, and the building is as cheap as materials can be put together to answer the purpose of a good school-house. The small porch over the steps is a very desirable feature for the comfort of the pupils and for the cleanliness of the house. It affords protection from rains while the pupils are cleaning their feet, and at the same time it relieves in some measure the monotony of the architecture. A glance at

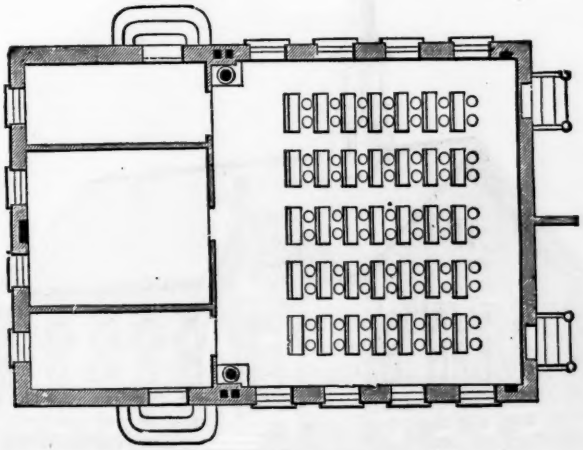


Fig. 65.

the engraving will show that, for just proportions, the roof of the porch is too low, and that when built, it should be elevated as far as the cornice permits.

In northern climates the foundations of buildings of this kind should be solid and continuous, both to give solidity to the structure and to prevent the circulation of cold air beneath the building. In the Southern States, however, it would be best to rest the building upon piers, to give a

free circulation of air beneath the entire building. This will make the school-room cooler in warm weather, and will tend to preserve the timbers from decay. The piers should be firmly and securely built, or the building will be racked.

ELEVATION 2.—This elevation represents a wood building with a batten finish. An inexpensive hood is placed above the windows, and a cupola surmounts the roof. This last feature may be omitted, as it is not an essential part of the

ELEVATION 2.

building. The roof of the porch is thrown up into a gable, producing a fine effect at little cost. The roof has a plain projecting cornice of the cheapest form. The same form of building may be finished with clap-boards, or it may be built of brick.

ELEVATION 3.—This elevation represents the plainest form of a brick building. The roof is about the usual pitch for shingles, and the only extra feature is the cupola, which may be omitted.

ELEVATION 3.

ELEVATION 4.—In this elevation the roof is made steeper than the last, the cornice lighter, and the extension of the cornice across the gable has been omitted The doorway is covered with a porch, which rises in the main roof in the form of a gable. The material may be brick, stone, or wood. The bell-tower is made smaller and lighter than that of No. 3.

ELEVATION 4.

In erecting houses of considerable size and cost, due attention should be paid to durability. If the present generation leave as a legacy to their descendants excellent school buildings, the next generation may be supplied with the apparatus and physical appliances necessary to secure the highest success of the school. If, on the contrary, our children must be heavily taxed for school-houses, the era of school improvement in regard to methods, libraries, and cabinets, must be postponed for another generation.

Wood is the material most commonly used in the construction of school-houses, on account of its cheapness; and it answers a very good purpose for the building of small houses and for those that are designed to be temporary. Permanent houses, however, should be built of brick or stone; and this especially should be the case in the construction of the more elaborate buildings.

Our next article on School Houses will treat of UNION SCHOOLS.

ERRORS IN THE USE OF PREPOSITIONS.

I.—REDUNDANCE.

THERE is, perhaps, no nicer test of a writer's ability to use language correctly than the manner in which he employs prepositions. No part of speech is more a matter of idiom in its use than this. Hence, nothing is more common than to find writers not thoroughly conversant with English idioms tripping in their use of these particles. Even writers of acknowledged excellence are, not unfrequently, at fault here.

We purpose to present a few of the most common cases of improprieties in the use of prepositions. "These may seem trifling matters," as Mr. Marsh says;* "but in a syntax, depending like ours so much upon the right use of particles, strict accuracy in this particular becomes seriously important." Some of the examples to be adduced may be familiar; but others, it is believed, will be found to be new. At all events, while the errors referred to are so common and wide-spread, it may not be amiss to call attention to them and warn against their use. These errors are mainly of three kinds, namely, a superfluous use, an improper omission, and a wrong application. In the present paper a few examples of the first kind only will be instanced.

1. One of the most common is found in the form "of seven years old." A recent writer speaks of "a sweet babe *of only six months old*." Another says, "He was succeeded by his great grandson, a child *of five years old*." Even Mr. Hall, in his "Recent Exemplifications of False Philology," says, (p. 50,) "Neither in Old England nor in New is there a plough-boy *of ten years old* that could not here set Mr. White right." In all these and similar examples the preposition *of* is really superfluous; it is used without an object. "Six months," "five years," etc., in these instances correspond to the adverb *how* in the question "How old is he?" Ask the

* Lectures on the English Language, p. 669.

question "How old is the babe?" and the answer is "Six months old;" not "Of six months old." (It is true, the answer might be "Of six months' age;" but this is a grammatically different form from the one under consideration.) In a word, the expressions "six months," "five years," "ten years," are adverbial phrases without any governing word. The idiom is precisely the same as in the expressions "five miles long," "six feet high," "ten inches thick," etc. "A wall *of ten feet high*," or "A river *of a mile wide*," would be just as correct as "A babe *of six months old*," or "A boy *of ten years old*." Dean Alford, it is true, attempts to justify this impropriety. He pronounces "A gallows *of fifty cubits high*" legitimate. (*Queen's Eng.*, p. 188.) But his charity for common errors misleads his judgment here. He argues that the gallows "may be said to be 'of fifty cubits' (high or in height); the *of* being used as in the phrases 'She was of the age of twelve years,' 'of a great age,' to indicate the class or standard of the object spoken of." But the examples are not parallel, as may be seen by omitting the *of* in both instances: "A gallows ( ) fifty cubits high;" "She was ( ) the age of twelve years." In the latter, *of* is a grammatical necessity; in the former, when used, it is a verbal excrescence, a nuisance.

Gibbon wrote, (Hist. of Rome, Chap. xiv.,) "The vanquished emperor left behind him two children, a boy of about eight, and a girl of about seven years old." Had he stopped with the word *seven*, or even *years*, his sentence would have been correct. But the addition of the word *old* rendered the preposition *of* superfluous. The same would be true if the phrase *of age* had been used instead of *old*. The following sentence of Hawthorne's errs in the same way: "This child of three years old occupied all his heart." Either *of* or *old* should have been omitted here. We should prefer the omission of the latter. The phrases "of about seven years" and "of three years" are equivalent to the fuller forms "of the age of about seven years" and "of the age of three years," of which in fact they are mere abridgments.

2. Similar to the foregoing, in point of inaccuracy and inelegance, is the form "at nine years of age," or "at nine

years old." The expression *nine years of age* corresponds grammatically to such forms as "three feet in depth," "six inches in width," "two miles in length," and requires no preposition before it, any more than do these latter expressions. Still, there are writers that know no better than to prefix *at*. Mrs. Child, for example, in her "Good Wives," speaking of Mrs. Hutchinson, says: "At four years old she read perfectly well;" "At seven years of age she had eight tutors." The error here, however, is not so much a redundancy as the misemployment of a preposition for an adverb. *At* in both instances should be *when*, and the sentences read accordingly: "When four years old she read perfectly well;" "When she was seven years of age," etc., or "When she was seven years old," etc.; or else, "At the age of seven (or, At seven years' age) she had eight tutors.' This last form is often elegantly abbreviated. Thus, "*At thirty* man suspects himself a fool," while perfectly correct, is far more pleasing than the unabridged form "at thirty years' age," or even than the form "at the age of thirty."

3. The use of *at* and *about* in juxtaposition—"at about"—is an inconsistency, not to say contradiction, that is very frequently met with. *About* conveys the idea of indefiniteness, anything but a want of preciseness in respect to either time or place. Its literal meaning is "in the neighborhood or vicinity of," "somewhere near." *At*, however, conveys the idea of definiteness and point. It fixes the place or time within comparatively narrow limits. "About the age of eleven" means not definitely eleven, but perhaps a year or so older, or a year or so younger—in that vicinity. "At the age of eleven," however, conveys another idea; it specifies the exact age. Hence the incongruity of the expression "at about." The following illustrates this error: "*At about* the age of eleven she passed a winter in London." —*Miss Browne's Memoirs of Mrs. Hemans.* Either drop one of these words altogether; or, if this does not convey the idea, say "At the age of eleven, or thereabouts, she passed," etc. The following are additional examples: "At about twenty miles from Berlin is situated the village of Sperenberg." "The company arrived at about nine o'clock, and left at near twelve."

It may not be amiss, in this connection, to advert to the loose way some have of using the word *about* when sufficient indefiniteness is expressed by other words. The following is an example of what we refer to: "The audience consisted of only about seventy-five or one hundred persons." The expression *seventy-five or one hundred* is sufficiently indefinite in meaning; and the coupling with this of a term designed to make the meaning more general is superfluous. It forms a species of tautology. Either say "consisted of only about a hundred persons," or "of less than a hundred;" or else drop *about*, and say "consisted of only seventy-five or one hundred persons." The meaning in all these cases is about the same, though it may be a matter of taste or choice which of the forms is used.

4. The adverbs *to-day*, *to-night*, *to-morrow*, and *yesterday*, should never be preceded by *on*. They are not so used by good English writers either of the past or of the present. And yet one can scarcely pick up a paper now-a-days without finding some one or more of these adverbs saddled with this impertinent preposition. Thus, "Sunday, at all times fertile in rumors, was particularly so *on yesterday*." "A great battle is not impossible *on to-morrow*." "On the morrow," as an equivalent of "to-morrow," is legitimate; but not "on to-morrow." As adverbs these words all involve the idea of "time during which." Thus, *to-day* means "on this day;" *to-morrow*, "on the morrow;" *to-night*, "on this night;" and *yesterday*, "on the day previous to this." Hence the *on* is superfluous, inelegant, and improper.

The same may be said of prefixing *on* to the phrases "last night," "last evening," "last week," "last year," "next Monday," "next week," "next month," etc. No speaker of any elegance or correctness will think of saying "On last evening," "On next Christmas," "On next Monday," any more than "On yesterday," or "On to-morrow." Still, it is perfectly legitimate and not inelegant to say "On Sunday last," "On Monday next," "On the fourth of July, "On Tuesday week," etc. Why there should be this difference, we may not be able satisfactorily to say. It belongs to the province of English idioms, and is one of those things uni-

versally recognized and observed by good writers and speakers.

5. Occasionally, after some form of the verb *to be*, a preposition is improperly prefixed to a noun in the nominative or its equivalent under the false impression of its being in the objective. The following are examples of this: "The first place we went to was *to* a meadow." "The only country in the world where there is true and false liberty is *in* the United States."—*Tablet.* "The best place in the city to buy hats is *at* Smith's." "The place of the next meeting has not been decided upon, but will probably be *at* New York." Here *to*, *in*, and *at* are severally redundant, and of course should be stricken out.

6. The phrase *in vain* is sometimes used where the sense requires the word *vain* only. "All his efforts were *in vain*," is an example of this, the meaning being that all efforts were useless, ineffectual. Properly *in vain* is an adverbial phrase, and hence should be used adverbially, not adjectively. The sentence "His labors were not in vain," is right if the meaning is that they were not put forth to no purpose. But, if the labors are designed to be described as useful and effective, *in vain* should be *vain*. The following examples will illustrate still further the needlessness of the preposition: "It is *in vain* [*i. e.*, idle, useless,] to extenuate the matter." "It is in vain for you to speak, he will not come." —*Fasquelle's French Course*, p. 188. "It is in vain for you to remonstrate with him."—*Ditto.*

7. With young and inexperienced writers it is a common error unconsciously to repeat a preposition improperly. Thus: "We may obtain approximations to the truth, *with* which, for want of better solutions, we are obliged to content ourselves *with*." "*On* what day did last January come in *on*?" "It was *at* one of these public houses we stayed *at*." In this last sentence the first *at* is the offender rather than the last; for the sentence fully and correctly expressed would be, "It was one of these public houses that we stayed at;" or, less idiomatically, "at which we stayed." In fact, writers of no little experience sometimes inadvertently err by thus repeating a preposition. Examples: "*In* what longitude, reckoning from the meridian of Green-

wich, would Madagascar be *in?*"—*Cornell's Int. Geog.* "Different kinds of wine are produced, according to the state of maturity *to* which the grape is allowed to arrive *at* before being gathered."—*Wilkes's Exploring Exped., Vol. I.*, p. 22. "The mission *on* which most men and women are called to go *upon*, does not call them away from home."—*Ed. of N. Y. Observer.*

S. W. W.

THE STRUCTURE OF THE APPALACHIAN ZONE.

PART FOURTH.

IN this brief survey, we have seen that the mountains composing the Appalachian Zone are made up of strata similar to those now forming. From analogy as well as from internal evidence we know that these were once horizontal, whereas now we find them bent, folded, turned up on edge, and in some cases even fractured. We have seen also that the curves tend to become broader and less steep as we follow them north-westerly, the whole resembling the ripples caused by casting a stone into a body of water, abrupt near the point of concussion, but becoming broader and gentler as they recede. Can we, from these facts, write the history of these mountains and determine the nature of the mighty force which exerted so tremendous an influence?

Often has this question been answered affirmatively, but the interpretation of the facts differ. It would be out of place here to enter into an elaborate discussion of theories respecting the origin of mountains. Only two hypotheses will be given, both of which have attracted much attention, and both are based on the structure of the Appalachians.

In 1842 the Brothers Rogers, after years of investigation amid these mountains, presented their celebrated theory. They hold that the wave-like flexures of the Appalachian strata are the result of an actual onward billowy movement, proceeding from beneath; a combined vertical and tangential movement. They argue forcibly that no merely vertical, no merely horizontal movement, alone, could produce

the phenomena. The wave-like undulations of the ground during earthquakes, so well attested by many observers, seemed to afford the key. It was assumed, therefore, that the earth's crust in these disturbed regions, rested on a widely extended surface of fluid lava, and that the accumulation of a vast body of elastic gases and vapors subjected this portion of the crust to an excessive tension, causing it to give way at successive times in a series of long parallel rents. The removal of pressure upon the lava by the explosive escape of the gases, would cause it to rise along the fissure like an enormous billow and to lift with it the overlying flexible crust. Gravity would produce a violent undulation of the lava surface, wave succeeding wave, flattening and expanding as they proceed and imparting a billowy motion to the overlying strata. Simultaneously with each epoch of oscillation, the undulating tract was pushed bodily forward, and secured in its new position by the permanent intrusion, into the rent and dislocated region behind, of the liquid matter, injected by the same forces which gave origin to the waves. This thrust would steepen the advanced side of each wave, and if repeated, as it would be near the region of greatest disturbance, would produce the folded or inverted structure.

Prof. James Hall announced his theory in the Palaeontology of New York, Vol. III. He rejects altogether an interior force and regards the flexures as resulting from depression of the crust. He believes that the line of the Appalachian barrier is due to the original deposition of material, not to any subsequent operation dislocating its strata, and that the declination of elevation westward is due to the thinning out of the formations. He holds that when large masses of sediment are spread along the sea-bottom the effect will be a yielding of the crust beneath and a general subsidence. The greatest depression, accordingly, would be along the line of greatest accumulation, and the settling would be less in the direction of the thinning margin. By this process the lower side became stretched, rents and fractures would occur on that side, while the compressed upper surface would be wrinkled and folded. This can be easily shown by bending a young twig. The outer surface is

stretched and finally gives way, while on the inner side the bark is thrown into folds. This folding has not contributed to the height of mountains. On the contrary, the sharper the fold, the more likely it is to be split or weakened at the arching, and so to be more liable to the effects of denuding agencies. In this way is explained the existence of so many mountains with trough-shaped strata; these mountains being merely the troughs of waves whose crests have been washed away.

Here then are two interpretations of the same record, yet diametrically opposed. Rogers' theory accounts for most of the facts, but leaves us a task, as difficult as the other, to account for the theory. The means employed, according to these authors, are too terrific, without analogue anywhere. It is inconceivable, too, how the fluid matter could be sustained in the rents and hollows so as to render the elevations permanent. To Prof. Hall's theory the main objection is, that the material accumulating, as it certainly did, in shallow water, is incompetent to affect the earth's crust, which is not less than fifty miles thick. Indeed, there is reason to doubt whether the earth has merely a crust. Ten years hence we may all believe our globe solid. At the same time there is much in favor of this theory. It is competent to account for the succession of phenomena and is easily illustrated by experiment. A long continued subsidence certainly did occur in the Appalachian region, for there we find shallow water deposits, many thousands of feet thick, each showing by the ripple markings that it was near the surface when deposited. The character of many strata shows that the rate of subsidence at times must have been exceedingly small, only a fraction of an inch per annum. It is more than probable that such a sinking over an extended area would cause a corresponding elevation at some point. Where would we look for such an elevation but in the trough itself? As shown in the experiment of the bent twig, the folds are sharpest where the compression is greatest. By this theory faults and other phenomena are susceptible of easy and reasonable explanation.

The determination of the time during which the Appalachian Revolution occurred depends upon some principles

respecting which all geologists are fully agreed. The facts on which these are based need to be summarily recorded.

After a careful study of life as shown in the successive strata of the earth's crust, geologists have divided the world's history into seven great ages, each marked by the dominance of some form of life. Earliest among the stratified rocks we find an enormous accumulation, many thousands of feet in thickness, everywhere controled and everywhere altered in their constitution, as though they had been subjected to a high temperature. In this process of alteration all traces of life, both animal and vegetable, would be obliterated, or at least rendered difficult of detection. Under such circumstances these rocks were classed together as belonging to the Azvic or lifeless age. Latterly, however, there have been discovered traces of life, low in order indeed, but still life, and so we know this immense series as the Evzoic, or the age of dawning life.

Resting on this contorted mass we find a succession of rocks, just such a succession as might be expected to rest on a continually subsiding sea-bottom, first a sandstone, then a mixed mass of sand and limestone, and finally a heavy limestone; a similar succession follows, the two series together making up the Silurian age, the age of mollusks or shell-fish. In this age no land plants existed, no mammals peopled the land, no fishes peopled the sea. Yet the rocks tell us that life in its lower forms was abundant, for some of the limestones are simply masses of shells tightly packed together. Stone lilies of wondrous beauty and complexity, waved to and fro on the bottom; uncoiled nautili, twelve feet in length, scoured the sea, myriads of little shells were everywhere, while tangled masses of strange sea-weeds grew in all the shallow waters.

Upon the Silurian, we find the strata of the Devonian age. In its earliest epochs we find a new form of life introduced, fishes, the first of vertebrates, appear in vast numbers; while corals, mollusks and articulated animals, so well represented in the previous age, still abound in the waters. We now find evidence of a main land, covered with soil and bearing vegetation, for even midway in its course we discover a few sea-drift logs of cone-bearing trees, carried

down some river to the sea, where, becoming water-logged, perhaps, they sank to be enveloped by the limestone forming below. Towards the close of this age, the evidences are more determinate, no longer mere fragments of wood, denuded of bark and rudely chafed by tossings on the water, but now branches of trees with bark preserved and even the leaves with all their striæ intact, so perfect as to admit of description.

Resting upon those of the Devonian, the Age of Fishes, we find the strata of the Carboniferous Age, the age of coal, of all ages the most important to man in its economic bearings. Here are our alternations numerous, sandstone, shale, coal and limestone, an ever-varying round, a complex puzzle, ever surprising the student with some new wonder. Here laid up for man's use are the coal and iron, the results of the labors of the plant-world for many ages, interstratified with shales and sandstones, the wash of the ocean shore, and limestone, the burial place of countless myriads of corals and sea-shells. Formed in marshes of vast extent and lining the sea-shore, the coal and its accompanying shales show no storm-tossed fragments of wood, finding here an accidental resting place. Here we find the primeval forests, standing as they grew, roots and trunks, while in, and directly above the coal we often see the impressions of their leaves, with those of humble ferns, all preserved as though they had been formed but yesterday, the fineness and perfection of their lines rivalling the most beautiful specimens of modern plants in our herbaria. Words cannot describe the matchless beauty of the roof as exposed by the removal of the coal beneath, where, in endless confusion, these impressions are spread out. Well have geologists called this the age of land-plants, for then, even in our latitude, the forests must have been as dense as similar low marshy regions of the torrid zone to-day. In the sea swarmed gigantic sharks, while mollusks, corals and stone-lilies still contributed to the richness of the fauna.

Next comes the Age of Reptiles. In the Devonian and Carboniferous seas fishes were supreme, but now the Reptiles. In the air the Pterodactyl, a flying dragon, with four feet spread of wings, fluttered in the stead of birds, on

the land were gigantic lizards seventy feet long, in the shallow waters the Plesiosaurus, with its large crane-like neck, lurked in the sea-weed, while farther from the shore, the huge Schthyosaurus, or fish-like reptile, scoured the sea for its prey. Strange animals these, descriptions of which "seem more like the dreams of fiction and romance, than the sober results of calm and deliberate investigation." Yet to any who will examine the evidence upon which our conclusions rest, no more doubt can remain that these once lived than can exist respecting the former life of the mummied men, apes and crocodiles now found in the catacombs of Egypt. During this age we have fishes still, corals, stone-lilies, mollusks and horse-shoe crabs, yet all inferior to the reptiles which now attain their maximum, and are henceforward to dwindle. On land we find a new feature, plants like those of our own time, but strangely mingled with others unrepresented to-day. Yet birds are almost wanting, and the mammalia are represented only by small insect-eaters.

Following this comes the Age of Mammals. Faintly foreshadowed by the little insect-eater, this age bursts upon us with all the grandeur of a new creation, without gradual evolution as in its predecessors. In the Bad Lands of our West, in the Gypsum quarries of Paris, in the Sinalik hills of India, we find the remains of huge mammals, which once swarmed over the surface of the globe, but which now, like the Great Auk of our northern seas, have forever disappeared, leaving behind them no descendants. During this age lions, tigers, elephants and hyenas of extinct species peopled the British Isles, associated with extinct species of rhinoceros and hippopotamus. In the Missouri country strange carnivorous animals allied to the hyena, dog and panther were associated with the rhinoceros, horse, deer and tapir-like animals. The elephant reached even to the borders of the great lakes, while the gigantic mastodon roamed over all our land east of the Mississippi. In the sea whales, seals, dolphins and the walrus lived. On the land birds were numerous, and the forests in which they sported wear a very familiar look. There were oaks, chestnuts, poplars, willows, tulip-trees and nearly all our common species. The lower orders of marine life are like our own.

In the early epochs no species are identical with those now existing, but later on we find twenty per cent., and at the close ninety per cent. of the shells undistinguishable from species of our own day.

Last of all the ages comes that for which all the others were preparatory—Man appears upon the earth. Now we find mammals, birds, reptiles and fishes. We have the articulates, the mollusks, and the corals, with their related sea-urchins and star-fishes; but as each grade in its turn gave way to one higher, so now do they all give way to man, for whose benefit they have been created.

Of these seven ages the first four are fully represented in the Appalachian Zone, and in the troughs bordering it on the east we see the earlier epochs of the fifth. It is evident that the great revolution forming this zone ended during the Carboniferous Age. The relative position of the rocks belonging to the Reptilian Age, and found in troughs along the eastern border, shows that they were deposited after the mountains in this vicinity had assumed their folded condition. To determine the time when this revolution began is attended with some difficulty. The Blue Ridge contains few strata younger than those belonging to the Eozoic Age, while in the other belts we find all the ages represented from the Eozoic to the Carboniferous inclusive. It would seem reasonable, therefore, to suppose that the operations producing the Blue Ridge took place at a much earlier date than those causing the other belts, or else that in the neighborhood of the Blue Ridge there was dry land from the Eozoic time till now. It is probable, however, that the whole Appalachian Zone is marked by the results of successive operations, and that the older mountains, those first formed, are in the south-eastern division.

The importance to us of the Appalachian uplifts can hardly be over-estimated. They have given birth to innumerable streams, which, cutting out the mountain sides and transporting the material thus set free, have found the alluvial plains of the Atlantic border and the Ohio valley, while uniting they afford broad highways for commerce. The waves of the strata have brought to the surface many beds of coal and iron, which otherwise would have been buried

so deeply that man could not have discovered them, or had he discovered could not have worked. Iron beds, well exposed and accessible in the Alleghany Mountains, lie eight thousand feet below the surface in the Ohio valley at the Kanawha River. At the same time many strata were changed in structure; bituminous coal became anthracite, coarse layers of limestone were converted into statuary marble, and the crude carbonates of iron were reduced to oxyds. It was only part of a far-reaching plan, in whose slow development the Creator looked forward to the introduction of man and prepared all things for his coming.

GEOGRAPHICAL NOTES.

NORTH POLE.—Examination of the survivors of the *Polaris* expedition by a Board appointed by the Secretary of the Navy, discovered no new facts in regard to the death of Captain Hall and the break-up on the ice, but made it certain that the former was purely natural (from apoplexy or paralysis), and that the separation of the party in the ship from that on the floe was accidental and unavoidable. Capt. Buddington, however, is shown to have been a hindrance to his chief while living, and to have had such an appetite for liquor as to make grog of the alcohol carried for scientific purposes. In Capt. Hall's writing-desk, which was preserved by the Esquimaux Joe, was found the original draft of a dispatch to Secretary Robeson, and this, together with the testimony of Capt. Tyson and Frederic Meyer, enabled the Board to arrive at the following summary of the geographical results of the expedition:

"The open Polar Sea, laid down by Kane and Hayes, is found to be in reality a sound of considerable extent, formed by the somewhat abrupt expansion of Kennedy Channel to the northward, and broken by Lady Franklin's Bay on the west, and on the east by a large inlet twenty miles wide at the opening and certainly extending far inland. Its length was not ascertained, and Mr. Meyer thinks it may be in fact a strait extending till it communicates with the Francis Joseph Sound, of the Germania and House expedition, and with it defining

the northern limits of Greenland. This inlet was called the Southern Fjord. North of it, on the same side, is the indentation of the shore, called Polaris Bay by Capt. Hall, where the Polaris wintered in latitude 81° 38′ north. The northern point of this bay was named Cape Lupton. Its southern point is yet without a name. From Cape Lupton the land trends to the north-east, and forms the eastern shore of a new channel from twenty-five to thirty miles wide, opening out of the sound above mentioned, to which Capt. Hall, as has already been stated, gave the name of Robeson's Straits. The western shore of these straits, north of Grinnell land, is also nameless. North-East of Cape Lupton, in latitude 81° 37′, is a deep inlet, which Capt. Hall called Newman's Bay, naming its northern point Cape Brevoort, and its southern bluff Sumner Headland. The trend of the land continues to Repulse Harbor, in latitude 82° 9′ north, the highest northern position reached by land during this expedition. From an elevation of 1,700 feet at Repulse Harbor, on the east coast of Robeson's Straits, the land continues north-east to the end of these straits, and thence east and south-east till lost in the distance—its vanishing point bearing south of east from the place of observation. No other land was visible to the north-east, but land was seen on the west coast, extending north as far as the eye could reach, and apparently terminating in a headland 84 degrees north. Mr. Meyer also states that directly to the north he observed on a bright day, from the elevation mentioned, a line of light, apparently circular in form, which was thought by other observers to be land, but which he supposed to indicate open water."

The scientific observations and collections appear to have been very full and valuable, and it is to be hoped will be recovered by the relief expedition sent out in the steamer *Tigress* by the Secretary of the Navy. The St. John's correspondent of the London *Times* notes "one or two facts connected with the winter quarters of the *Polaris* in the most northerly latitude in which any expedition has ever passed a winter:"

"Captain Tyson describes the climate as being distinctly milder than it is several degrees further south. In June the extensive plain which surrounded the harbor in which the ship was ice-bound was free from snow, and such flora as those regions boast appeared. A scant, creeping herbage covered the ground, sufficient to nourish the numerous musk oxen which range these plains. Of these the Expedition shot between thirty and forty. That these animals can exist here through the Winter is a fact in itself indicative of a milder temperature. In midsummer, when the air was still, the sun was sometimes disagreeably hot, and it would seem as though, after passing the

icy barrier which extends from the 70th to the 80th degree, the climate became sensibly modified. No Esquimaux or Arctic Highlanders were met, but their traces were perceived; and what is more interesting is the fact that driftwood from the northward was picked up which had floated through Robeson's Straits, through which a southerly current runs of a knot an hour. It was too much decayed to show clearly the traces of having been sawn or cut. Besides, musk oxen, rabbits, and lemmings were abundant, one or two bears were seen, the wild flowers were brilliant, and numerous birds from southern latitudes came northward in the Summer; and some of the party ascended the high table-land which rose from the plain near which they were anchored, and which, in its turn, was overtopped by a higher range. A marked difference in character between the eastern and western shore was evident, the former being apparently more favored in climate and vegetation. The mountain ranges on the western side were far more rugged, barren, and precipitous. In midwinter, notwithstanding this comparatively favorable account of the aspect and climate of the Winter-quarters, it was so cold that bullets of frozen quicksilver were fired through a two-inch board."

Mr. Clements R. Markham, of the British Arctic Expedition of 1850–51, writes to *Nature* (issue of May 29) as follows:

"The news brought by the boat's crew of the *Polaris*, if at all accurate, is very important. It proves that even such a vessel as the *Polaris* may advance up Smith Sound, in one season, to 82° 16′ N. It is stated also that at, or near this point, the land, both of Greenland and Grinnell Land, was still trending northward. From such a point, an extended party, with dépôt parties, organised on McClintock's principles of sledge traveling, could reach the North Pole and return to the ship. Another important fact is that the *Polaris* was beset in 80° 2′ N. and drifted out into Baffin's Bay. This shows that there is not a constant block of ice in the strait, but that the floes drift down with the current, leaving, as a consequence, an occasional navigable lane between the drifting ice and the land floe. These facts are most satisfactory, and increase the prospect of a successful exploration of the unknown region by way of Smith Sound."

BRITISH AMERICA.—Surveys are now going on to complete the definition of the forty-ninth parallel boundary between this country and the United States. The work has already been performed eastward from Fort Pembina to the Lake of the Woods. During the present summer the line will be extended from the Fort to the Rocky Mountains. The Hon. Archibald Campbell, of the U. S. Commission, has general charge and will make the report to Congress.

MEXICO.—Last month we gave some account of Commander Selfridge's interoceanic canal route by way of the Napipi and Atrato Rivers. Of the U. S. Nicarauga Survey for the same object we have little news to give, but there comes from it no such triumphant note as from Commander Selfridge. "*If* a canal is ever put through," we read, "it will have to occupy the valley of the San Juan River." The Tehuantepec survey, under Commander Shufeldt, has published a full report of its explorations, which enables us to compare its route (via the Coatzacoalcos River) point by point with that *via* the Atrato: 144 miles of canal against 28; 140 locks against 20; 732 feet summit level against 128; a feeder 27 miles long, involving three miles of traveling and some heavy cutting, against no artificial feeder. For the remainder of its construction the Tehuantepec Canal will be, if not easy, at least not impossible. Probably, we infer, the job will be a slighter one than Selfridge's three miles of gigantic tunnelling, and three of open cuts. As for expense, Commander Shufeldt hazards no precise estimate, but intimates that it would be too great for private capital. Then he frankly enumerates earthquakes, heavy north and south winds, and an anarchic society (State of Oaxaca), as obstacles not to be despised.

——"It is estimated," says the report from which we have been quoting, "that of the 8,000,000 inhabitants of the Republic of Mexico, 5,000,000 are Indians, direct descendants of the Aztecs and other aboriginal tribes and races:"

"The Indians are found settled over the whole Isthmus, generally living in towns or villages, or large haciendas. They are of a mild and gentle disposition, little inclined to war or cruel practices. They seem to have but little natural fondness for hunting, although the country abounds in game. The men are rather smaller than the Indians of our own Western plains, but, nevertheless, they are very muscular, and possess, many of them, wonderful endurance. In color they are lighter than our own Indians, and their features are much finer, and the expression of the face is more pleasing. . . . These people are invariably hospitable to strangers, and often cheerfully give up their bed and hammock for their accommodation, for which they never make any charge; but if any food is taken they expect to be paid for it. The dogs, pigs, and chickens occupy the house in common with the family. The women perform all the house-work,

assist in cultivating the milpas, and prepare and cook the food. They rise before the men in the morning, often as early as three o'clock, and begin the preparation of the morning meal. We found the Indians remarkably honest and faithful attendants, and not one of our party had anything stolen during our residence on the Isthmus. The robberies in Mexico are rarely committed by this class."

——We may venture on one other extract, as it opens up an interesting subject:

"We expected to encounter a great many serpents on the Isthmus, and each person, therefore, went fully prepared with the means for applying an antidote at a moment's notice, should he be bitten; but during our residence there we saw only a very limited number of serpents, the most of which belong to species that were quite harmless. No one of the party was bitten, or even attacked, notwithstanding the fact that our explorations led us into the densest forests and the most unfrequented regions. . . . . We heard of several deaths that had resulted from the bites of serpents. But these cases are very rare, probably not more frequent than similar occurrences in our own forests."

This is quite in keeping with the subjoined paragraph, which we clip from *Nature:*

"There is a very good article in the *Field* for January 4, exposing some popular delusions with regard to the dangers incurred by living in or traveling through countries where snakes are abundant. The writer thinks it would be difficult to produce a well-authenticated instance of a European having been killed by a snake in any tropical country. Many of these delusions the writer ascribes to the sensation stories found in some popular novels, *e.g.* 'Tom Cringle's Log,' and some of Marryatt's works, as also in the narratives of credulous travelers, and even in the works of such an eminent ornithologist as Audubon. 'The actual risk incurred,' the writer says, 'by those who visit and explore the haunts of snakes is practically so inconsiderable as very soon to become habitually as much disregarded as is the existence of the common adder in this country.'"

To the same effect speaks the late Mr. Charles Waterton in his "Essays on Natural History" (London, 1871):

"When I was in the forests of Guiana, I could never coax an Indian to approach a snake with composure, although I showed him that no danger was to be apprehended if he only went the right way to work..... Snakes are not revengeful; neither are they prone to be the aggressors..... In no instance have I seen a snake act on the offensive..... *Noli me tangere*—do not touch me with intent to harm me, is a most suitable motto for a snake..... Confiding in the

notion that snakes never use their poison-fangs, except when driven to extremities, I would rove in the forests, day after day, without shoes or stockings, and never consider myself in danger from them.. ... When a man is ranging the forest, and sees a serpent gliding towards him (which is a very rare occurrence), he has only to take off in a side direction, and he may be perfectly assured that it will not follow him..... A man may pass within a yard of rattlesnakes with safety, provided he goes quietly; but should he irritate a rattlesnake, or tread incautiously upon it, he would infallibly receive a wound from its fangs."

AFRICA.—The mail facilities of Central Africa have enabled a letter from Dr. Nachtigal to reach Gotha in fourteen months. The course of this celebrated German explorer has been as follows: He left Tripoli Feb. 18, 1869, on a mission to the friendly Sultan of Bornu, bearing sundry royal gifts from the Emperor Wilhelm. Arriving at Murzuk (oasis of Fezzan) March 27, he was prevented from proceeding southward till April 18 of the following year (1870). The interval was utilized by making a hardy excursion to Tibesti (June 6 to Oct. 8, 1869), in the eastern half of the desert of Sahara. He finally reached Kuka, the capital of Bornu, July 6, 1870, delivered his presents, and was very well received. At this city he lingered till 1871, hoping to obtain an opportunity, which his slender resources almost denied him, of exploring the country northeast of Lake Chad. This he accomplished in the course of the year, visiting the adjacent states of Kanem, Egai, and Bodele, as far as Borku, during a space of nine months, and obtaining most interesting information concerning the physical features of the region, its productions, inhabitants, customs, etc. Borku was found to lie in a depression lower than the level of Lake Chad, whose waters it drains through the Bahr-el-Ghazal (not to be confounded with Schweinfurth's Nile tributary of the same name.) This river has hitherto been supposed to flow into Lake Chad. Its course is northeast, and about 320 miles in length. The Borku basin rises on the north into a mountain range, whose pass is at least 7,878 ft. high, and which stretches in a gigantic circle from Tibesti to Durfur. Dr. Nachtigal reached the 18th parallel in this journey, and approached within 150 miles of his old route to Tibesti, so that his explorations now form a con-

nected series of great magnitude and importance. At the date of his writing from Kuka, Feb. 23, 1872, he was on the point of essaying a new journey to the south of the lake, in the country of Baghirmi, whose capital, Massena, had just been captured by the enterprising Sultan of the powerful state of Wadai. The *Academy* of May 15 remarks on these discoveries:

"It will be seen that Dr. Nachtigal's travels have already opened out a vast region of the Eastern Sahara. No mountains approaching the altitude of those which he has found in Borku have hitherto been discovered in any part of the Sahara region west of the Nile or between the Soudan and the Atlas range. His determination of an outflowing river from Lake Chad is also of the highest interest in its bearing upon a contested point of physical geography—whether all lakes without an outlet are necessarily salt or brackish. Lake Chad, the waters of which are certainly fresh and potable, has been held up as the great exception to this rule, and the equilibrium has been believed to be maintained by great evaporation alone. Dr. Nachtigal's discovery, however, places Lake Chad precisely on a parallel with the corresponding Lake N'gami in the southern area of African continental drainage, which overflows periodically by the Zouga, and with Lake Titicaca in the Bolivian highland, discharging its surplus waters to the Pampa Aullagas lake by the Desaguadero."

——The French ship *Narval*, Commander Mouchez, left Lorient May 1, for a five months' cruise on the coast of Algeria. Under the direction of Prof. H. de Lacaze-Duthiers (zoölogist) and M. Vélain (geologist) of the Paris Faculté des Sciences, the hydrographic map of these shores will be completed. The professor will make frequent soundings, and study the fauna of the Mediterranean.

AUSTRALIA.—In India it is the elephants that endanger the telegraph by rubbing against the poles. In China, the cable is at the mercy of thieves, who not only cut it and carry it off in the modest lengths of a yard or two, but have even stolen it by the mile and a half! They twist the thicker iron wires of the outer coating of the cable into mooring chains for native fishing boats; fashion the smaller wires into fish-hooks; and sell the copper cover for divers uses. In North Australia white ants are the particular pest of the poles:

"It appears that they devour the growing trees, and sometimes eat off the living boughs. The rapidity with which they consume even well-dried timber is astonishing. It is put into a roof to-day, and before a week fine powdery dust is observed falling from it as the minute agents of destruction are at work. Wooden buildings must be renewed every three or four years at the farthest. But this interesting insect appears to have an especial 'down' on the telegraph poles. Many of them are scooped out and honey-combed, and now stand mere shells, waiting for the first strong wind to blow them over. The insulation pins are coated with a non-conducting varnish, but it makes no difference, they are riddled and eaten up bodily by the ants. They have not yet taken to eat the wire, but it seems likely that very soon there will be nothing left but the wire. It appears that before long it will be found needful to reconstruct the line with iron posts through the territory thus infested."

Bibliography.—JENNESS, JOHN SCRIBNER. The Isles of Shoals, an historical sketch. New York: Hurd & Houghton.——MARKHAM, A. H. Cruise of the *Rosario* amongst the New Hebrides and Santa Cruz Islands. London.——SAINT-MARTIN, VIVIEN DE. L'Année Géographique. [Geographical Annual for 1872.] Paris.——THOMSON, J. Illustrations of China and its People. Two hundred photographs, with descriptive letter-press. London.

Cartography.—Petermann's *Mittheilungen* for May 8 has maps of the Russian campaign against Khiva, and of Ernst Giles's travels in Central Australia. Stieler's Hand-Atlas, Part 13, contains maps of Greece and the Archipelago; the East India Islands; and the United States (4th section).

Photography.—Readers (and haply writers) of Geographical Notes must have their summerings, and one of the most delightful functions of the stereoscope is to guide us in our choice of a rural retreat. Of this sort of friendly service there might be, we need not say, no end at the Messrs. Anthony's. Indeed, one might almost consent to commute his real excursion to "fresh woods and pastures new" for unlimited ranging on a world-tour through their shelves. All that we shall venture to do this month is to name a few of the picturesque nooks in which our beautiful country abounds.

(a) Western readers will not object to our mentioning only Eastern resorts. Any one who has visited the watering-places of New England knows that Western tourists, eager for a glimpse and a sniff of the salt sea, nearly monopolize some of them. How it is at the Delaware Water Gap, we do not know. Here, in No. 2232, we have a view of *Marshall's Falls, from the Ravine.* It is a tiny cascade, comparatively, seen through a rock opening; athwart the picture leans a tree which was long ago thus inclined, for the branches on the uppe side, whose foliage is dimmed by the strong light, have sought by

shooting up straight to compensate for the want of perpendicularity in the parent stem. From the Delaware River to the Housatonic: No. 120, *The Falls below Milford, Conn.* Should we read here "New Milford?" or is the tranquil stream here pictured the Wopowang, which empties into the Sound three miles eastward of the Housatonic? In either case, these peaceful hillsides powerfully invite to relaxation and dreamy dozing. Following up the valley of the Housatonic we come to *Monument Mountain, Stockbridge, Mass.* Nos. 6338, 6339 are charming outlooks from this famous eminence, perhaps taken from the Pulpit Rock which we remember to have climbed for the prospect in 1859. As boys we enjoyed about equally the munificent expanse eastward and—the huckleberries with which the summit abounds! And now, seated cross-legged on our magic carpet, let us transport ourselves to Nantucket, and learn a little natural history from Mr. J. Freeman's views of *Cutting a fin-back whale*, the several parts being hooked on board the whaler as the carcase lies along side. Some beauty, too, is here to please the eye in the concentric (elliptic) lines of this whale's belly. A flower-petal is not more delicately marked. The body is 60 feet long, and will yield 23 barrels of oil.

(b) Geography in its broadest sense includes history, and in its narrower includes ethnology—the knowledge of the inhabitants of a country as well as of its rivers and water-sheds. In this department, too, the stock of the Messrs. Anthony is extremely rich. Generally their views of famous men and women of the time are not stereoscopic, yet not a few are. For example, the representative *par excellence* of the American ministry, Henry Ward BEECHER is admirably portrayed by Gurney & Son. The prince of "agitators," Wendell PHILLIPS, has justice done at once to his handsome features and to his character in Sarony's portrait of him. A typical American traveller (not the highest type), and also a typical American man of letters (again not the highest), is seen in the fur-capped Bayard TAYLOR (Sarony). A loftier poet, whose face is familiar to all, we recognize in William Cullen BRYANT *(ib.)*; and poet and humorist of a later school is Bret HARTE *(ib.)* Still another type of our versatile American humor we need not be ashamed to exhibit—"Josh Billings" (Gurney)—a sober-looking man as he walks the streets; here with a bare suggestion of a roguish twinkle in the eye, as if the thought of a "mule" had crossed his mind. A funny genius, if not a positive humorist, exists in the person of P. T. BARNUM (Howell), who shall stand to-day in our catalogue as the type of American humbug, money-making, indomitable energy, unscrupulousness—of a great many virtues and some national defects and vices. Mr. B. Gratz BROWN (Sarony) will serve, as well as another, as a type of politicians; Gen. GRANT (Gurney) as a politician in spite of himself; Gen. Robert ANDERSON (Gurney) as a soldier who did his duty when politicians failed in theirs. Of foreign celebrities we can adduce only those who

have in a manner naturalized themselves: Christine NILSSON (Gurney), less an artist and less a woman than is both artist and man Anton RUBINSTEIN (Sarony), whose head is that of Beethoven's beautified, and his expression wonderful to behold as he loses himself in his performance.

LEIF ERIKSON.

IT has lately been proposed to erect a monument to Erikson as the discoverer of America, and however strangely it may sound to associate his name with that event, his claims to the honor appear to be of no little weight. They rest not only upon the ancient Norwegian accounts of his landing in "Vinland" or "Wineland," but also upon monuments found in this country, of which the celebrated "Dighton Writing Rock" inscription is the most important. All that we know of Erikson is that his father Erik the Red emigrated from Norway to Iceland, from which country he was banished for murder, and that he finally settled in Greenland. He made frequent voyages between his home and Iceland, being accompanied by Herjulf Baardson and his son Bjarne. On one occasion Bjarne was in command of a vessel sailing to Greenland, when he was surrounded by a dense fog and driven by a strong wind to the American coast. He did not disembark, but returned home and reported the discovery.

"Leif Erikson bought Bjarne's ship and undertook the voyage with thirty-five men, of whom several probably had followed Bjarne. He sailed directly to Helluland, which he named so on account of the appearance and nature of the country. Their description of the country agrees with what modern teachers say of New Foundland. From this land Leif sailed southward, and after a voyage of three days came to a land which they called Markland, on account of its extensive forests. Their description of this country, with its low shores, white sandhills and wooded regions, agrees entirely with the present Nova Scotia, New Brunswick and Lower Canada. From Markland Leif sailed two days to Vinland, which, judging by the time taken in reach-

ing it, was fifty to sixty miles (Norw.) farther south, and this part of America agrees fully with the description Leif gave of it. He says the land had no mountains, that it was covered with woods and low hills. Leif built houses at Mount Hope Bay, through which Taunton river empties into the sea at Seaconnet Point. The saga-writer makes an astronomical remark, which leads us to find the place at which Leif settled. He says that on the shortest day of the year the sun rose at 7h. 30m., and set at 4h. 30m. According to this, the latitude of the place was 4°, 29′, 10″, which coincides with Seaconnet Point and entrance to Mount Hope bay. The products found by Leif were the same that now enrich those beautiful regions. Grapes grew abundantly without cultivation as well as maize, called in the *saga*, wheat; and forest and sea yielded in abundance the same kinds of game and fish as at the present day."

Prof. Charles Rafu, who ranks as the first authority on Northern antiquities, has translated the ancient Norwegian accounts or *sagas* which relate the history of Erik, and he vouches for their genuineness. Those who have seen them, or *fac similies* of them, declare that they are free from modern interpolations. The truth of the statements made in these *sagas* is further confirmed by the writings of Adam of Bremen, who visited Denmark, and there heard of this newly discovered land. It is also a noteworthy fact that Columbus was in Iceland in 1477, and may there have heard accounts which either strengthened, or even originated the purpose which he afterwards carried out. Of the relics of the Norwegians in this country the "Dighton Rock" is, as we have said, the most important. In the year 1000 Erikson is said to have landed near Fall River, Mass., and to have spent the winter there. Seven years after, Thorfinn Karlsevne reached the coast, and left the inscription on the rock of which we are speaking. *Orfine* is still to be traced on it, and the number CXXXI, which was probably the number of the exploring party. The figures of a woman and child are also visible, which may commemorate the fact that, during their stay there, Karlsevne's wife bore him a son. Besides these evidences an armor was dug up many years ago at Garnet Point, Mass., which Berzelius, the

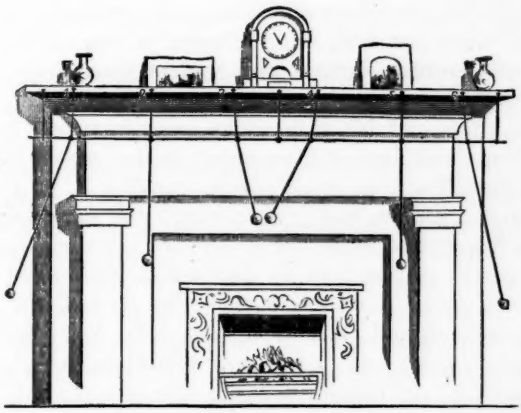
famous chemist, declared to be identical with the Norwegian armor of the tenth century. The "Old Mill" at Newport is also regarded by some as a relic of the Norwegian occupation. Should the truth of the testimony adduced be proved, we will be obliged to grant to the Vikings or Norsemen the honor of discovering the American continent, at least the eastern side of it. The credit of being the original discoverers may be due to some of the Mongolian races, who crossed by Behring's Straits, and settled in Mexico and Central America.

RESONANCE.

THOSE of our readers who remember when the suspension bridge at Niagara was completed will doubtless recall the interesting fact, that, when a dog ran slowly across the immense structure, it was observed to vibrate or swing more, from this apparently slight cause, than though it were being crossed by a flock of sheep or a drove of cattle. This rather startling result was due to the fact, that the dog, by his regular, swinging gait, transmitted to the bridge itself a similar motion, and that at length this swinging became not only readily perceptible, but often violent. To avoid a similar result, it is the custom, when a body of soldiers cross a bridge of this construction, to compel them to break step. This phenomenon of responsive vibration is known in physics as resonance; and it is not always necessary that the solid bodies thus affected be in actual contact, as may be illustrated in the following manner: Let the reader place his lips near the sounding-board of a piano, or other stringed instrument, give a short, sharp whistle, and then listen intently, with his ear close to the wires. It will then be noticed that the instrument has taken up the note from the lips, and responds to it in the same key. If the proper apparatus were at command, we might discover, moreover, that the wire giving forth the responsive note was the one that, owing to its length and size, vibrated in

waves similar to those produced by the lips of the whistler, and that the motion was transmitted from the one to the other through the air. In like manner, fine jets of flame may be made to vary in height by the sounding of musical notes. Even a stream of falling water is made to change in its vibration by the sound of a human voice, or the same effect is produced by a note struck from a violin. In each of these cases of the piano, the gas-jet, or the water-fall, the intervening medium along which the vibrations were transmitted was the air.

Another method by which these vibrations are transmitted is best illustrated by the accompanying engraving,



Method by which Vibrations are Transmitted.

which has been prepared so that the experiment may be readily repeated by any one interested in the subject. The engraving illustrates, perhaps, the most wonderful and mysterious feature of this law of resonance; since, as we shall see, not only can motion be transmitted along solids of any length, but two or more sets of vibrations will pass along the same body at the same time, without interfering with each other, and yet causing only those bodies to respond which vibrate in unison.

Across the top of the mantel, as shown in the figure, a narrow strip of board is so placed that its edge shall project

slightly. About four inches below this board a stiff piece of wire or thin strip of wood is suspended, being held in position by three short cords, a centre and two end ones. At six equidistant points along the edge of the board suspend that many pendulums made of cord, attached to large bullets or smooth pebbles. In arranging these pendulums, let 1 and 6 have cords of equal length; also 2 and 5, and 3 and 4. Each cord must also be twisted around, or knotted to, the suspended wire, as shown in the figure. Thus prepared, the apparatus is complete. If now we set No. 1 ball swinging gently on a line with the wire and mantel,—that is, from right to left,—it will be observed that No. 6, which is the only pendulum having a cord of equal length, will at once respond, the others remaining quiet or nearly so. No. 6 starts slowly at first, but increases in the extent of its movement until it becomes more violent than No. 1, which now swings more slowly, till it comes to a dead stop, when it again starts, and No. 6 becomes quiet in turn. Now, if while No. 1 and 6 are still swinging in the manner described, we start No. 3, we shall notice that No. 4, its partner, takes up the motion, and goes through the same performance as No. 6; and while these four are vibrating back and forth, each in response to its companion, Nos. 2 and 5 still remain at rest. If either of these be started, the other would respond, and thus along this solid body we have transmitted three sets of waves or vibrations, which, without interfering with each other, are able to make only those weights respond which are attached to cords of equal length. Having thus placed in the reader's hands, by the aid of an illustration, the apparatus needed, it is hoped that enough of interest will be awakened to induce further study of this and other kindred phenomena.—*Industrial Monthly.*

HON. J. R. BUCHTEL, founder of the college in Ohio bearing his name, has offered to give $20,000 for a woman professorship in it, provided the women of the State will subscribe an equal sum to complete the endowment.

CREAM OF THE EDUCATIONAL MONTHLIES.

THE principal articles in the June number of the *California Teacher* are, Fundamental Principles of Teaching Language, Object Teaching, (both translated from German,) Froebel's Kindergarten System, and Crumbs of Literature. In the latter the writer suggests that we should pay more attention to English Literature, and make it attractive by interesting pupils in the authors personally. A short biography, not simply the date of birth and death, but a few anecdotes of an author will do much toward awakening an interest in his works. The idea is a good one, and with a little trouble teachers could make it productive of good.

AMONG the subjects which receive attention in the *Connecticut School Journal* we notice, The Teacher for the Times, Normal Teaching, What is it? A Word to Acting Visitors, Recent Decisions in School Cases, and The Self-Reporting Problem. The latter discusses a subject which has troubled every teacher, and some good points are given by the writer, who favors self-reporting rather than the system of spying, which some teachers practice. She omits, however, to mention one very important point in keeping order in school, and that is that there shall be as few rules as possible. Teachers should explain that the object of all the regulations is to conduct school exercises in the way best calculated to benefit the pupils, and that they are not for the personal gratification of the instructor. When pupils understand this, and know that no unnecessary rules are made, they will more readily obey them, and the result will be beneficial to both teacher and taught. We are sorry to find such wretched book reviews in so excellent a publication as the *Connecticut School Journal.* Since January it has praised *everything*, which is right enough when deserved, but in its "Book Notices" we find indiscriminate praise awarded to some very indifferent books.

Maine Journal of Education. Contents: The Bodies of the Saints, Moral Instruction in Public Schools, An Out-

look, and Style in Teaching. The article of the most practical importance, though not the most carefully prepared, is The Bodies of the Saints—saints in this case being teachers. Their ill health is ascribed to worry, want of exercise, and improper ventilation of the school room. The two latter, we think, are the chief causes of the billiousness of so many teachers, and the lack of ventilation has much to do with the dullness of the pupils. The air in the school room should be changed at least four times a day. Exercise is a *duty* for teachers, a duty to themselves and to their scholars. A half-sick instructor makes dull work of it, do the best he may. In the article we refer to another cause of ill health is given—"starchiness." However, we do not believe anyone ever died of that, and the writer seems to forget that dignity is natural to some people.

The Intelligence Department of the *National Normal* is always full and interesting. Foreign Educational Veneering, Teutonomania, and some Foreign Correspondence form the body of the June number. "Shoddyism" receives a terrible "setting down." It seems that it is responsible for sending so many of our young people to Germany to study. The fact is that those who go to Germany are almost without exception college graduates. They have gone as far as they can go here, and, not wishing to stop, they continue their studies abroad. It is simply the action of the law of supply and demand. If we had a university here, it is unlikely that our youth would go three thousand miles to attend one. The writer says: "We have all known many instances of persons filling professional chairs, editing educational journals and occupying other high positions, who though lacking ordinary mental capacity, glory triumphantly in a fine coat of educational veneering received at some foreign university, usually in Germany, the language of which country they can not speak." This is sheer absurdity, for if they cannot speak German they cannot understand it, and without that it would be impossible to get even a "veneering."

THE *New York State Educational Journal* discusses The Bureau of Education, Trained Teachers, State Aid to Acade-

mies and Union Schools, and various other topics. It also has a tilt at Algebra, and wants to drive it out of the schools, at least one of its writers does. As is justly remarked, there is nothing in it to "cheer in the midst of toil;" very little hilarity would result from saying a formula or two when one was blue, and, as a provocative of mirth, Algebra is hardly to be defended. We think it, however, a good discipline for the mind. After all, we do not go to school so much to learn, as to *learn* to learn, and everything which strengthens the mind is valuable.

Progressive Discipline, The Health of our Children at School, our Habits of Reading, Government of Schools, and Teachers and School Committees, are some of the articles contained in the *Rhode Island Schoolmaster*. The paper on the health of school children is the second part of a very sensible discussion of that subject. The "hot house" pressure, and the practice of making children work when they should be at play, receive due condemnation. The writer touches a more potent cause of the languor often observed in school children in the late hours which some are allowed to keep. Many children are at parties, or are sitting up to read, when they should be in bed. We all know the proverb—"Early to bed, early to rise," etc. Its practice will give us health at any rate, and that is of more importance than riches or wisdom.

Old and New for July is largely devoted to colleges. There is much more of the "old" than of the "new" in its notice of RUTGERS. Theodore Frelinghuysen figures as a professor. He was formerly president, but died some eleven years ago.

A BOSTONIAN who asked his boy what he had learned at school one day, was told that his lesson had been: "Johnny shut yer jaws and can't run." He went to the school the next day, heard the teacher tell the boys to repeat, "A comma is just a pause to count one," and then heard the class all shout in unison: "Johnny shut yer jaws and can't run." Explanations followed, and that teacher is now striving to acquire more distinct enunciation.

CORRESPONDENCE.

MR. EDITOR,—In an article, in your May number, entitled "*Popular Errors as to the Sun's Time and Place*," there are several errors, which I am sorry to see, and for which I find it difficult to account. As one of them may mislead persons not well versed in the case, will you not do them and me the favor of correcting it?

On page 192, it says, "If any one wishes to determine the exact point east from his door, let him on the morning of either of the equinoxes, note, on the distant horizon, the tree-top, or house, or mountain crag, over which the centre of the sun passes in rising." This is all right; but the next sentence is: "Nor will any difference be made in the result if, by reason of the observer's place being in a valley or on a ridge, that distant crag or tree-top should be far above or far below the astronomical horizon; for the sun's centre will be upon the east and west lines through *the whole of the revolution*, that day and that night."

Now, there *will be* no difference made if the reader will keep his mind fixed, (as the writer kept his) on the fact that the sun's path that day is in the *celestial equator, whose plane cuts the horizon in points due east and west.* But most people, instead of this, and very naturally, will judge of the sun's place by supposing a plumb line dropped from *his* place in the heavens to *its* place upon the horizon, and that will certainly *not be* east or west. For at *meridian* of that day the shadow of a plumb line will be thrown due north, and at 9 o'clock or 3 o'clock the shadow will fall north-west or north-east; showing that the sun's place at these hours is respectively due south, south-east or south-west. So much for correction of Error No. 1.

The second is so evidently *a slip* either of the types or of the transcriber's pen, as scarcely to call for notice. On the same page (192) and sixteen lines from top, the article speaks of the sun's "place of rising and of setting" at the summer solstice, as being so "many degrees north of east." Any intelligent reader will, in his mind, either omit the words "and of setting" or supply the words "or of west."

At the close of the next sentence occurs Error No. 3. Speaking of the sun's momentary risings and settings, at the two solstices, to persons living just below the polar circles, it says that "these momentary risings and settings are always *due south*," whereas it should have said "*due north*, or *due south*." But these last two errata can do no harm by misleading. They only mar the article.

Respectfully yours,

F. R. GOULDING.

"SITTING OR SETTING?" AGAIN.

MR. EDITOR:—A communication from "S. W. W." with the above-named title, in the May number of your journal, has interested me so much that, with your indulgence, I respectfully submit the following on the other side of the question:

It is true that the verb set has a transitive and an intransitive sense; but the latter is its exceptional use, which is more generally supplied by the verb sit. Webster says: "set is the factitive or causative verb of sit."

What learned authorities your correspondent may have consulted when he remarks: "In speaking of their [hens'] character or habit as incubators, we should say 'setting hens,' not 'sitting hens;'" I do not know; but this I do say, that I nowhere find his dictum sanctioned by Webster or by Worcester, standards justly regarded by Americans as final.

The former's definition of sit (No. 6,), is to incubate; to cover and warm eggs for hatching, as a fowl. So says Worcester (No. 8,), substantially. Neither lexicographer gives a kindred meaning to sit, intransitive.

"S. W. W." says that a sitting hen is not necessarily a setting hen, or, rather, what he calls a setting hen. Perhaps not: how does he mend the matter by the unauthorized use of set? Persons who, like the agricultural editor, believe in following approved models of expression are not likely to be misled, seriously, when told that a certain fowl is sitting; and if confusion of thought should arise, the difficulty would not be obviated by the barbarous substitute, setting.

I am sorry that this issue has been made public on the

page of so eminent a periodical as "THE MONTHLY;" for the article mentioned takes a stand around which the defamers of our mother tongue will gladly rally. Surely, one of the first duties of American teachers should be to guard their pupils, by precept and by example, against the affectations of pedantry and the vulgarisms of the street. Into what company "S. W. W." would lead us, I leave your discerning readers to determine. S.

EDUCATIONAL INTELLIGENCE.

ARKANSAS.—During the past year many districts erected new school buildings, and in other ways increased their educational facilities, expecting to meet the expenses incurred by an increased rate of taxation. In some sections the local boards were extravagant, and authorized enormous assessments. This was seized upon by the enemies of the free school system as a pretext for obtaining the passage of a law by the Legislature, limiting the school-tax to one-half of one per cent. That body also ordered the issue of interest-bearing certificates, and made them receivable for school taxes. This paper has depreciated, until now it is worth only one-half its par value. The effect has been that the districts are unable to meet their pecuniary obligations, and many teachers have left the State. It is to be hoped that the Legislature will, at its next session, repair the damage done. The report of the Circuit Superintendents are so imperfect, that it is impossible to exhibit the true condition of education in Arkansas. The present year shows a decrease of 37,064 in attendance, and there are 93 less teachers than at the previous report. We have no means of knowing the increase of the school population of the State.

CONNECTICUT.—HARTFORD.—Mr. Joseph Carew and his wife have given $5,000 to Hartford Seminary, the income of which is to support a course of lectures, to be open to the public as well as to the students.

NEW HAVEN.—One hundred and twelve students graduated from the academic department at Yale on Thursday, June 26th.

KANSAS.—EMPORIA.—Commencement at the State Normal School was made the occasion of dedicating a new normal school building. It cost $65,000, and is capable of accommodating 300 students. There were only three in the graduating class this year.

LOUISIANA.—Political disturbances have had an injurious influence upon the schools. Funds to defray the expenses are not forthcoming, and indeed were all the appropriations promptly paid, they would still be insufficient. The Superintendent of Public Instruction says: "The taxable property of this State is estimated at $251,000,000. The assessment of the two-mill tax on this valuation gives the schools of this State a gross revenue of $500,000. This is not enough to educate one-half of the children in the parish of Orleans. If the entire school revenue from all sources in the State, the two-mill tax, the interest on the sales of school lands, the license of the Louisiana State Lottery (a stain on the General Assembly), the seminary fund, the poll tax, and the city school tax, was given to the School Board of New Orleans, they still would not have means sufficient to maintain the schools needed for her own children." The educable population of the parish of Orleans is 90,166; that of the State 280,384. The returns made by district superintendents are so incomplete that we are unable to determine what advance has been made since the last report.

MARYLAND.—The school population is 114,974; average daily attendance, 55,168; the number of teachers, 2,333. Total expenditure for public school purposes, $1,238,101.30. Outside of Baltimore eight new schools have been opened, and twenty-eight new teachers have been employed; but while there has been an increase in the number of teachers, there has been a decrease of $24,297.25 in the salaries paid. The number of pupils has decreased 2,286. The State Normal School is prospering, having 162 students.

MICHIGAN.—The Superintendent of Public Instruction, whose term of office has recently expired, gives a short review of the changes which have taken place during the past eight years. He says: "I entered upon the duties of the office, Jan. 1, 1865. The report of my predecessor showed the number of children between the ages of five and twenty years, to be 280,772. The whole number attending school that year was 215,736. The value of school-houses and lots was $2,085,372. The number of graded schools was 123. The whole number of qualified teachers was 8,816. The whole amount paid for teachers' wages was $591,335.33.

"Such are some of the leading statements, concerning the condition of the schools at that time.

"The following statement shows their present condition: The number of children between the ages of five and twenty years is 405,026. The whole number attending school the past year is 303,212. The value of school-houses and lots is $7,469,296. The number of graded schools is 292. The whole number of qualified teachers is 11,642. The whole amount paid for teachers' wages is $1,658,891.54."

NEW JERSEY.—The total amount raised for all school purposes is $2,263,070.30; total value of school property, $4,966,788; total number of children between the ages of 5 and 18 years, 279,149; attendance at public schools, 180,514; attendance at private schools, 35,305; non-attendants, 63,330. We note with pleasure that while the number of teachers has increased by 144, the salaries have been raised; males receiving $4.77, and females $2.23, more per month. Of the 144 new teachers only 3 are gentlemen. Under the present law all public schools are free, and, during the past year, the first of the working of this system, it has proved highly satisfactory.

NEW BRUNSWICK.—The graduating class at Rutgers numbered 39. The degree of LL.D. was conferred on David Murray, Ph.D., formerly professor of mathematics at this venerable institution, and now Commissioner of Education for the Japanese Empire.

ITHACA.—98 students graduated from Cornell University this year. 58 have applied for admission, of whom four are

ladies. Mr. Hjalmar Hjort Boyeson has been appointed professor of the Scandinavian languages.

NEW YORK.—NEW YORK CITY.—The fourth annual commencement of the Normal College took place at the Academy of Music, on Tuesday evening, July 1st. The exercises, which consisted of recitations, songs, and essays, were presided over by Mr. Wm. H. Neilson, President of the Board of Education. The graduating class numbered 78.

RHODE ISLAND.—PROVIDENCE.—The commencement exercises of the Normal School were highly interesting, consisting of the reading of essays, and the rendering of musical selections by the pupils.

The principal made his annual report, and delivered an address to the graduating class, 34 in number. Gov. Howard awarded the diplomas. The whole number of pupils attending the school during the past year was 156.

The graduating class of Brown University numbered 42.

SOUTH CAROLINA.—Total school population in 1871, 209,376. Number attending school in '71, 66,056. The present year shows an increase of 10,266 in the number of pupils taught. The total of 2,185 teachers employed, is an increase of 287 over the previous year. Since the last report 226 new school houses have been erected. The State supplies text-books free, a plan which the Superintendent of Public Instruction disapproves. The State appropriated $300,000 for the support of schools, but, owing to the bankrupt condition of the exchequer, none of the money could be obtained.

A THEOLOGICAL SEMINARY was opened at Honolulu, Sandwich Islands, October 1, 1872, with four professors.

Schoolmaster—"Of what does the surface of the earth consist?" *Pupil*—"Of land and water." *Schoolmaster*—"Very well. Now, in order that I may see if you clearly understand the subject, I will vary the question a little. What do land and water make?" *Pupil*—"Mud."

CURRENT PUBLICATIONS.

IT is undoubtedly true that when you kill a man you calm him, he probably never was calmer, but one would hardly understand that you had "translated his life unto death," did you say that you had "calmed" him. Such is, however, the synonym for kill, given in a dictionary (1) recently published. So too, hate, has dislike for its equivalent, although a moment's thought shows that there is a wide difference between them. Courtship is given as the synonym for love. Now we affirm that two men may love each other without an idea of courting each other, while on the other hand, if we may credit the stories we hear, there is many a courtship without love. These are errors which a most cursory examination of the book reveals. The author appears to have laid down as a rule that for every word he must have six or eight synonyms and, since our language is not so rich in synonymous words, he has been obliged to connect those which do not belong together. Generally the first two or three synonyms are reliable, but the others frequently express widely different ideas.

Of the companion (2) to this book we can speak in more favorable terms. It is small but contains a large list of words, although we fail to find many of every-day occurrence, as cravat, spaniel, turkey, canter, caucus, etc. Magenta is omitted also, but since it is "conspicuous by its absence" in both Webster and Worcester, we cannot find fault with this smaller dictionary for overlooking it. Caucus is a new word, and yet its origin is not clear. A writer in the *Knickerbocker Magazine* gives this account of its derivation. In 1870 a quarrel arose between the British soldiers stationed at Boston and some ropemakers of that city. In one of the conflicts resulting from the trouble several civilians were killed. The caulkers formed a union,

(1) A DICTIONARY OF SYNONYMS OF THE ENGLISH LANGUAGE, with Roots, Definitions, and the Pronunciation of each word. New York: G. P. Putnam & Sons. 1873.

(2) A DICTIONARY OF THE DERIVATIONS OF THE ENGLISH LANGUAGE, in which each word is traced to its Primary Root. Forming a Text-book of Etymology, with Definitions and the Pronunciation of each Word. New York: G. P. Putnam & Sons.

and held meetings to decide as to what course to pursue, and the tories in derision named them "caulkers" meetings, which was afterwards contracted into caucus.

A work so small as this dictionary must of necessity omit many words, and no two people could agree as to where the line should be drawn; but we are somewhat surprised to notice the absence of so many familiar words, and to see so many uncommon ones mentioned. The derivations are correct so far as we have noticed, but in some instances the information is not full enough to be of practical use. *Ambitio* is given as the source of ambition; but we are not told that the "going about" was used of candidates seeking office, and that hence comes our meaning of the word, a desire for power. So, too, expend is properly derived from *ex* and *pendere*, but no mention is made of the custom of weighing out money. It is true that many already know these little things, but then too, many do not. Like all of Putnam's publications this book is well printed, and has an attractive appearance.

Facts and Fancies, published by the same house, is one of the "goody" book order, being a collection of dull stories, with morals attached. One will give an idea of the book. Cornelia Harden was invited by her cousin to act as bridesmaid, but like Miss Flora McFlimsey, she had "nothing to wear." The bride related the sad circumstance to the groom, and he, with the reckless disregard for expense which possesses young men about to be married, bought a dress for Cornelia. It fitted perfectly, was beautiful, etc., but as Cornelia's mother remarked, it was rather "lightish." That good woman also added, "you are so neat, you will never get a spot on it, I am sure," and Miss Cornelia remarked, "Oh, no!" But alas for poor Cornelia! When they left the train, which they had taken to reach the home of the bride, she found that Mr. John Randall, one of the bridal party, had improved his time in the train by spitting tobacco-juice over her dress, and had ruined it. Moral:—Do not chew tobacco, or if you do, do not spit on people.

The same firm have added eight volumes to their Elementary Science Series.

WE are often told that Adam was the first gardener, but educators should not forget that he was the first philologist as well, and that his first philological exercise—that of naming the animals of Eden and its vicinity, according to their several characteristics—may have grown out of his experience of their ways and antics in the garden. At all events, a garden has been the favorite resort of eminent scholars and literary men from that day to this: though but few of them, it must be confessed, have understood so well as our clerical friend the novelist, chaplain and horticulturist, Rev. E. P. Roe, how to derive both play and profit from a garden.[3] Mr. Roe begins his wonderful tale by the astounding statement that in a single year—1871—he received from the sale of fruits and vegetables from his garden of two and a half acres, at Highland Falls, N. Y., over two thousand dollars, besides having ample supplies for himself and family. What is more to the purpose, he tells in a very pleasant, Tristram Shandyish way how he did it; and we gather from the book that it was not by any extraordinary skill or professional tact that he achieved such a wonderful success, but that through manifold blunders, patient and persevering labor in all his leisure hours, and availing himself of all his opportunities for disposing of his products, that he attained to his great success. The book is one which it will do any teacher or professional man good to read; his puns are now and then a little too laborious, but that we attribute to their *earthy* origin—they certainly seem to have cost considerable sweat of the brow; but the work is, in spite of these, eminently readable, and if his counsels are followed would prove, we think, eminently profitable.

"The American Educational Readers," (IVISON, BLAKEMAN, TAYLOR & CO.,) have been compiled by educators whose experience in elementary education ought to qualify them for their work. The series is graded, and while no radical changes are introduced into the usual plan of school reader making, some new features are added which increase the freshness and usefulness of these books. In the first

(3) "Play and Profit in my Garden." By Rev. E. P. Roe, author of "Barriers Burned Away." New York: Dodd & Mead.

reader words are connected with the objects they represent in a manner calculated to associate the words and the objects in the mind of the pupil. For example, in the sentence "The cow has a horn," the word "cow" is printed on a picture of that animal. The more advanced books contain reading exercises which impart information of real value to the pupil. The mechanical work is admirably done, the illustrations being the finest we have seen in school books.

"SWINTON'S WORD PRIMER," published by the same house, is intended for pupils who have already gone through some reading primer. The words are grouped according to leading ideas, as "names of playthings," "things we eat," and are divided into monthly and yearly sections. The lessons are short and the words are generally those which children will readily comprehend. Definitions are given and the distinction is taught between words which differ in spelling but not in pronunciation. Words often misspelled as "very," "their," etc., are given especial attention, and there are a few exercises in grammar. These are the main features of this little volume which contains much which is useful.

"Questions of the Day," by J. Hall, D. D., (DODD & MEAD) is a book which will interest a large class of people. The twenty-five lectures which it contains were delivered to the Bible-class conducted by the author, and while the questions are of "to-day" they will be none the less interesting many years hence. They are considered with a fairness which must compel admiration even if we do not always agree with the conclusions reached. This liberal, christian spirit is a delightful change from the acrimony which often characterizes discussions on these subjects. "Ferdinand De Soto," is one of a series of biographies of American Pioneers and Patriots, published by the same house.

KENELM CHILLINGLY and OLD KENSINGTON, published by Harper & Brothers, are two of the most charming novels we have seen in a long time. They have little in common it is true, except that in both there is little adventure and much real life pleasantly described. Kenelm always

was grown up, and at the age of eight, asks his mother if she is not sometimes oppressed by a consciousness of her own identity; while Dorothy, in Old Kensington, is a little girl who develops into a noble woman in the course of the story. The charm of these books consists in this, that they are the histories of a real gentleman and a real lady, using those words in their better sense. It may be this which associates the two in our mind.

The difference between the male and female characters in Kenelm is very marked, the former being strong, and possessing decided peculiarities, while the latter are rather common-place. Cecilia Travers is good-natured, Lady Chillingly a nonentity, and Lily too fairy-like to be classed among mortals. Wit and wisdom are scattered all through the book, and if Kenelm occasionally becomes too pedantic, he manages to say a great many bright things. Parents would do well to ponder Sir Peter's discourse on names. In both of these books the description of real life is very faithful, and, if we may be allowed such an expression, their tone is healthy.

A Strange Story, and A Hand-Book for Travelers in Europe, have lately issued from the Harper's press.

THE *Swiss Times* gives a melancholy statement as to the condition of the poor in the Canton of Berne, which has been compiled from the reports of the Statistical Society and data furnished by sixty local physicians. At the end of last year, out of a total population of 506,475, there were 1,512 idiots and crétins, and 1,292 persons suffering from mental aberration, of whom, by the way, scarcely a third could be received into the asylums. These figures show that in the canton the ratio of idiots and insane to the population is as 1 to 180, while in England the proportion is 1 to 300.

YOU cannot teach a child to take care of himself, unless you will let him try to take care of himself. He will make mistakes; and out of these mistakes comes his wisdom.

THE SCHOOL-ROOM.

Words by DR. W. J. WETMORE. *Music by* U. C. BURNAP, *Mus. Doc.*

Allegretto.

1. In the years that are gone when the mer - ry heart was
2. Our.. friends were very dear, for we met them day by
3. But the heart is ver - y sad, for.... fad - ed now and
young, And we nev - er dreamed of sor - row or de - cay:.....
day, Our hearts were as light as swal - lows on the wing;.....
gone Is youth with its dreams of pleas - ure and of joy;.....
..... Bright Hope, like a bird, of life's bloom - ing pleas - ures
..... We wandered to the fields, and we plucked the ro - ses
..... Oh! where are the school - mates of child-hood's ear - ly

THE SCHOOL-ROOM.

sung, And Joy gay - ly sang his roun - de - lay;..... 'Twas
gay, In the glowing hours of childhood's ear - ly spring..... To the
dawn, How Time doth our hap - pi - ness de - stroy!..... On a
then.... to the school-room we hur - ried on a - pace, Our kind, lov - ing
for - est, too, we roved, then to hear the mer - ry notes Of the Ori - ole high
hill near by the school, look-ing down up - on the plain, Where wil - lows to
mas - ter there to greet;..... For we knew that he wait - ed with
swing - ing on the spray;..... How sweetly to the ear did his
sigh - ing breez - es wave,..... Sleeps the master that we loved—may we
pleasant, smil - ing face, To wel - come us our les - sons to re - peat.
witching mu - sic float, Till the gold - en rays of day - light fled a - way.
all.... meet a - gain, In a school-room bright-er far be - yond the grave.